

Having thus described the preferred embodiments,
the invention is now claimed to be:

1. A method of irradiating fluoropolymer
material comprising:

removing oxygen and oxygen containing gases from
an irradiation chamber;

5 irradiating the irradiation chamber with
penetrating ionizing radiation;

passing fluoropolymer material through the
ionizing radiation in the oxygen and oxygen containing gas
depleted environment of the irradiation chamber.

2. The method as set forth in claim 1 wherein
the irradiating step includes pulsing accelerated
electrons through the irradiation chamber.

3. The method as set forth in claim 1 wherein
the irradiating step includes:

accelerating electrons;

5 directing the accelerated electrons through the
irradiation chamber to break chemical bonds in and
electrically charge the fluoropolymer material.

4. The method as set forth in claim 3 further
including:

5 applying one of magnetic and electromagnetic
fields to cause rotation of the charged fluoropolymer
material in the irradiation chamber.

5. The method as set forth in claim 3 wherein
the removing step includes:

removing air and water vapor from the
irradiation chamber.

6. The method as set forth in claim 1 further
including cooling irradiated polymeric material.

7. The method as set forth in claim 1 wherein the depleting of oxygen and oxygen containing gases from the irradiation chamber includes:

drawing a vacuum in the irradiation chamber.

8. The method as set forth in claim 7 wherein the vacuum is at least 10^{-1} Torr.

9. The method as set forth in claim 8 wherein the vacuum is at least 10^{-4} Torr.

10. The method as set forth in claim 1 further including:

entraining the fluoropolymer material in gas and passing the gas through the irradiation chamber;

5 after passing the entrained fluoropolymer material through the irradiation chamber, separating the fluoropolymer material from the gas;

recirculating the gas to entrain more fluoropolymer material.

11. The method as set forth in claim 1 wherein the irradiation chamber is a sealable container and further including:

5 sealing a batch of the fluorocarbon material in the container;

the removing step includes reducing oxygen and oxygen containing gases by drawing a vacuum in the container; and

10 the passing step includes passing the container through the ionizing radiation.

12. The method that is set forth in claim 11, wherein the ionized radiation is a pulsed electron beam.

13. An apparatus for irradiating fluoropolymer materials comprising:

a radiation source for generating a beam of radiation;

5 an irradiation chamber through which the beam of radiation passes;

a vacuum pump for drawing down oxygen and oxygen and oxygen containing gases from the irradiation chamber; and

10 a source of fluoropolymer material for supplying fluoropolymer material to the irradiation chamber.

14. The apparatus as set forth in claim 13 further including:

a cooler for cooling the material which has been irradiated in the irradiation chamber.

15. The apparatus as set forth in claim 16 wherein the radiation source includes:

a particle accelerator which accelerates electrons; and

5 a scan horn which fans the electrons into an electron beam directed into the irradiation chamber.

16. The apparatus as set forth in claim 13 wherein the radiation source is a pulsed electron accelerator.

17. The apparatus as set forth in claim 13 further including:

at least one of magnets and electromagnetic coils disposed adjacent the irradiation chamber for reorienting the fluoropolymer material.

18. The apparatus as set forth in claim 13 further including:

an entraining mechanism for entraining particulate fluoropolymer material into a stream of oxygen depleted gas;

a pneumatic conduit for conveying entrained fluoropolymer material from the entraining mechanism to the irradiation chamber;

a separator disposed downstream from the irradiation chamber for separating the fluoropolymer material from the entraining gas;

another pneumatic conduit which conveys gas from the separator back to the entraining mechanism; and a pump for circulating the gas.

19. The apparatus as set forth in claim 18 further including:

a chiller disposed between the irradiation chamber and the separator.

20. The apparatus as set forth in claim 13 wherein the irradiation chamber with received fluoropolymer material is pumped down to a vacuum of at least 10^{-1} Torr and further including a conveyor for conveying the irradiation chamber through the radiation beam.